First Hit

Generate Collection Print

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TITLE: Data storage device for fast multiple file write operations

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INVENTOR-INFORMATION:

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US-CL-CURRENT: 360/69; 360/74.1

CLAIMS:

We claim:

1. A data storage device comprising a computer useable medium having computer readable program code disposed therein for recording information on a data storage medium, the computer readable program code comprising a series of computer readable program steps to effect: receiving a first command to record first information on said data storage medium; receiving said first information; moving said data storage medium in a first direction; recording said first information beginning at a first time on said moving data storage medium; receiving a first deferred conditional write tape mark command; and setting at a second time a first deferred conditional tape mark indicator.

2. The data storage device of claim 1, wherein said first information comprises: a first header label group; first data; and a first trailer label group.

3. The data storage device of claim 2, wherein said computer readable program code further comprises a series of computer readable program steps to effect: writing said first header label group to said moving data storage medium; writing a first tape mark adjacent said first header label group; writing said first data adjacent said first tape mark; writing a second tape mark adjacent said first data; writing said first trailer label group adjacent said second tape mark; and writing a third tape mark adjacent said first trailer label group.

4. The data storage device of claim 1, wherein said computer readable program code further comprises a series of computer readable program steps to effect: specifying a deferred conditional tape mark indicator time interval; and maintaining said first deferred conditional tape mark indicator during said deferred conditional tape mark indicator time interval.

h e b b g e e e f c e h e ge

5. The data storage device of claim 4, wherein said deferred conditional tape mark indicator time interval is between about 5 seconds and about 20 seconds.

6. The data storage device of claim 5, wherein said deferred conditional tape mark indicator time interval is about 10 seconds.

7. The data storage device of claim 4, wherein said computer readable program code further comprises a series of computer readable program steps to effect: receiving a second command at a third time to record second information on said data storage medium, wherein the time interval between said second time and said third time is less than said deferred conditional tape mark indicator time interval; receiving said second information; resetting said first conditional deferred tape mark indicator; moving said data storage medium in a first direction; recording said second information on said moving data storage medium; receiving a second deferred conditional write tape mark command; setting a second deferred conditional tape mark indicator at a fourth time; moving said data storage medium only in said first direction during the time interval between said first time and said fourth time.

8. The data storage device of claim 7, wherein said second information comprises: a second header label group; second data; and a second trailer label group.

9. The data storage device of claim 8, wherein said computer readable program code further comprises a series of computer readable program steps to effect: writing said second header label group to said moving data storage medium adjacent said third tape mark; writing a fourth tape mark to said moving data storage medium adjacent said second header label group; writing said second data to said moving data storage medium adjacent said fourth tape mark; writing a fifth tape mark to said moving data storage medium adjacent said second data; writing said second trailer label group to said moving data storage medium adjacent said fifth tape mark; and writing a sixth tape mark to said moving data storage medium adjacent□□16A said second trailer label group.

10. The data stor□ge device of claim 3, wherein said computer readable program code further comprises a series of computer readable program steps to effect: receiving a second command, wherein said second command causes motion of said data storage medium in a second direction or causes synchronization of said data storage medium; resetting said first deferred conditional tape mark indicator; disposing a double tape mark on said data storage medium by writing a fourth tape mark adjacent said third tape mark; moving said data storage medium in a second direction; positioning said read/write head between said third tape mark and said fourth tape mark.

11. The data storage device of claim 10, wherein said computer readable program code further comprises a series of computer readable program steps to effect: determining if said double tape mark was successfully written to said data storage medium; determining if said read/write head was successfully positioned between said third tape mark and said fourth tape mark.

12. The data storage device of claim 11, wherein said double tape mark was not successfully written to said data storage medium, and wherein said read/write head was successfully repositioned between said third tape mark and said fourth tape mark, wherein said computer readable program code further comprises a series of computer readable program steps to effect indicating an UNWRITTEN DEFERRED TAPE MARK error message.

13. The data storage device of claim 11, wherein said double tape mark was successfully written to said data storage medium, and wherein said read/write head was not successfully repositioned between said third tape mark and said fourth tape mark, wherein said computer readable program code further comprises a series of

computer readable program steps to effect indicating a DATA CHECK/LOST POSITIONING error message.

14. The data storage device of claim 11, wherein said double tape mark was not successfully written to said data storage medium, and wherein said read/write head was not successfully repositioned between said third tape mark and said fourth tape mark, wherein said computer readable program code further comprises a series of computer readable program steps to effect: indicating a DATA CHECK/LOST POSITIONING error message; and indicating an UNWRITTEN DEFERRED TAPE MARK error message.

15. A data storage and retrieval system comprising a data storage device, a data storage medium removeably disposed in said data storage device, and a host computer which provides first information to said data storage device, wherein said data storage device comprises a computer useable medium having computer readable program code disposed therein for recording information on a data storage medium storage medium, the computer readable program code comprising a series of computer readable program steps to effect: receiving a first command to record first information on said data storage medium; receiving said first information; moving said data storage medium in a first direction; recording said first information on said moving data storage medium beginning at a first time; receiving a first deferred conditional write tape mark command; and setting a first deferred conditional tape mark indicator at a second time.

16. The data storage and retrieval system of claim 15, wherein said first information comprises: a first header label group; first data; and a first trailer label group.

17. The data storage and retrieval system of claim 16, wherein said computer readable program code further comprises a series of computer readable program steps to effect: writing said first header label group to said moving data storage medium; writing a first tape mark adjacent said first header label group; writing said first data adjacent said first tape mark; writing a second tape mark adjacent said first data; writing said first trailer label group adjacent said second tape mark; and writing a third tape mark adjacent said first trailer label group.

18. The data storage and retrieval system of claim 15, wherein said computer readable program code further comprises a series of computer readable program steps to effect: specifying a deferred conditional tape mark indicator time interval; and maintaining said first deferred conditional tape mark indicator during said deferred conditional tape mark indicator time interval.

19. The data storage and retrieval system of claim 18, wherein said deferred conditional tape mark indicator time interval is between about 5 seconds and about 20 seconds.

20. The data storage and retrieval system of claim 19, wherein said deferred conditional tape mark indicator time interval is about 10 seconds.

21. The data storage and retrieval system of claim 15, wherein said computer readable program code further comprises a series of computer readable program steps to effect: receiving a second command at a third time to record second information on said data storage medium, wherein the time interval between said second time and said third time is less than said deferred conditional tape mark indicator time interval; receiving said second information from said host computer; resetting said first conditional deferred tape mark indicator; moving said data storage medium in said second direction; recording said second information on said moving data storage medium; receiving a second deferred conditional write tape mark command; setting a second deferred conditional tape mark indicator at a fourth time; wherein

said data storage medium is moved only in said first direction during the time interval between said first time and said fourth time.

22. The data storage and retrieval system of claim 21, wherein said second information comprises: a second header label group; second data; and a second trailer label group.

23. The data storage and retrieval system of claim 22, wherein said computer readable program code further comprises a series of computer readable program steps to effect: writing said second header label group to said moving data storage medium adjacent said third tape mark; writing a fourth tape mark to said moving data storage medium adjacent said second header label group; writing said second data to said moving data storage medium adjacent said fourth tape mark; writing a fifth tape mark to said moving data storage medium adjacent said second data; writing said second trailer label group to said moving data storage medium adjacent said fifth tape mark; and writing a sixth tape mark to said moving data storage medium adjacent said second trailer label group.

24. The data storage and retrieval system of claim 15, wherein said computer readable program code further comprises a series of computer readable program steps to effect: receiving a second command, wherein said second command causes motion of said data storage medium in a second direction or causes synchronization of said data storage medium; resetting said first deferred conditional tape mark indicator; disposing a double tape mark on said data storage medium by writing a fourth tape mark adjacent said third tape mark; moving said data storage medium in a second direction; positioning said read/write head between said third tape mark and said fourth tape mark.

25. The data storage and retrieval system of claim 24, wherein said computer readable program code further comprises a series of computer readable program steps to effect: determining if said double tape mark was successfully written to said data storage medium; determining if said read/write head was successfully positioned between said third tape mark and said fourth tape mark.

26. The data storage and retrieval system of claim 25, wherein said double tape mark was not successfully written to said data storage medium, and wherein said read/write head was successfully repositioned between said third tape mark and said fourth tape mark, wherein said computer readable program code further comprises a series of computer readable program steps to effect indicating an UNWRITTEN DEFERRED TAPE MARK error message.

27. The data storage and retrieval system of claim 25, wherein said double tape mark was successfully written to said data storage medium, and wherein said read/write head was not successfully repositioned between said third tape mark and said fourth tape mark, wherein said computer readable program code further comprises a series of computer readable program steps to effect indicating a DATA CHECK/LOST POSITIONING error message.

28. The data storage and retrieval system of claim 25, wherein said double tape mark was not successfully written to said data storage medium, and wherein said read/write head was not successfully repositioned between said third tape mark and said fourth tape mark, wherein said computer readable program code further comprises a series of computer readable program steps to effect: indicating a DATA CHECK/LOST POSITIONING error message; and indicating an UNWRITTEN DEFERRED TAPE MARK error message.

29. A computer program product usable with a programmable computer processor having computer readable program code embodied therein for disposing information on a data

storage medium using a data storage device comprising a read/write head, comprising: computer readable program code which causes said programmable computer processor to receive a first command to record first information on said data storage medium; computer readable program code which causes said programmable computer processor to receive said first information; computer readable program code which causes said programmable computer processor to move said data storage medium in a first direction; computer readable program code which causes said programmable computer processor to record said first information on said moving data storage medium beginning at a first time; computer readable program code which causes said programmable computer processor to receive a first deferred conditional write tape mark command; and computer readable program code which causes said programmable computer processor to set a first deferred conditional tape mark indicator at a second time.

30. The computer program product of claim 29, wherein said first information comprises: a first header label group; first data; and a first trailer label group.

31. The computer program product of claim 30, further comprising: computer readable program code which causes said programmable computer processor to write said first header label group to said moving data storage medium; computer readable program code which causes said programmable computer processor to write a first tape mark adjacent said first header label group; computer readable program code which causes said programmable computer processor to write said first data adjacent said first tape mark; computer readable program code which causes said programmable computer processor to write a second tape mark adjacent said first data; computer readable program code which causes said programmable computer processor to write said first trailer label group adjacent said second tape mark; and computer readable program code which causes said programmable computer processor to write a third tape mark adjacent said first trailer label group.

32. The computer program product of claim 29, further comprising: computer readable program code which causes said programmable computer processor to specify a deferred conditional tape mark indicator time interval; and computer readable program code which causes said programmable computer processor to maintain said first deferred conditional tape mark indicator during said deferred conditional tape mark indicator time interval.

33. The computer program product of claim 32, wherein said deferred conditional tape mark indicator time interval is between about 5 seconds and about 20 seconds.

34. The computer program product of claim 33, wherein said deferred conditional tape mark indicator time interval is about 10 seconds.

35. The computer program product of claim 32, further comprising: computer readable program code which causes said programmable computer processor to receive a second command at a third time to record second information on said data storage medium, wherein the time interval between said second time and said third time is less than said deferred conditional tape mark indicator time interval; computer readable program code which causes said programmable computer processor to receive said second information; computer readable program code which causes said programmable computer processor to reset said first conditional deferred tape mark indicator; computer readable program code which causes said programmable computer processor to move said data storage medium in said first direction; computer readable program code which causes said programmable computer processor to record said second information on said moving data storage medium; computer readable program code which causes said programmable computer processor to receive a second deferred conditional write tape mark command; computer readable program code which causes said programmable computer processor to set a second deferred conditional tape mark

indicator at a fourth time; computer readable program code which causes said programmable computer processor to move said data storage medium only in said first direction during the time interval between said first time and said fourth time.

36. The computer program product of claim 35, wherein said second information comprises: a second header label group; second data; and a second trailer label group.

37. The computer program product of claim 36, further comprising: computer readable program code which causes said programmable computer processor to write said second header label group to said moving data storage medium adjacent said third tape mark; computer readable program code which causes said programmable computer processor to write a fourth tape mark to said moving data storage medium adjacent said second header label group; computer readable program code which causes said programmable computer processor to write said second data to said moving data storage medium adjacent said fourth tape mark; computer readable program code which causes said programmable computer processor to write a fifth tape mark to said moving data storage medium adjacent said second data; computer readable program code which causes said programmable computer processor to write said second trailer label group to said moving data storage medium adjacent said fifth tape mark; and computer readable program code which causes said programmable computer processor to write a sixth tape mark to said moving data storage medium adjacent said second trailer label group.

38. The computer program product of claim 35, further comprising: computer readable program code which causes said programmable computer processor to receive a second command, wherein said second command causes motion of said data storage medium in a second direction or causes synchronization of said data storage medium; computer readable program code which causes said programmable computer processor to reset said first deferred conditional tape mark indicator; computer readable program code which causes said programmable computer processor to dispose a double tape mark on said data storage medium by writing a fourth tape mark adjacent said third tape mark; computer readable program code which causes said programmable computer processor to move said data storage medium in a second direction; computer readable program code which causes said programmable computer processor to position said read/write head between said third tape mark and said fourth tape mark.

39. The computer program product of claim 38, further comprising: computer readable program code which causes said programmable computer processor to determine if said double tape mark was successfully written to said data storage medium; and computer readable program code which causes said programmable computer processor to determine if said read/write head was successfully positioned between said third tape mark and said fourth tape mark.

40. The computer program product of claim 39, wherein said double tape mark was not successfully written to said data storage medium, and wherein said read/write head was successfully repositioned between said third tape mark and said fourth tape mark, further comprising computer readable program code which causes said programmable computer processor to a series of computer readable program steps to indicate an UNWRITTEN DEFERRED TAPE MARK error message.

41. The computer program product of claim 39, wherein said double tape mark was successfully written to said data storage medium, and wherein said read/write head was not successfully repositioned between said third tape mark and said fourth tape mark, further comprising computer readable program code which causes said programmable computer processor to a series of computer readable program steps to indicate a DATA CHECK/LOST POSITIONING error message.

42. The computer program product of claim 39, wherein said double tape mark was not successfully written to said data storage medium, and wherein said read/write head was not successfully repositioned between said third tape mark and said fourth tape mark, further comprising: computer readable program code which causes said programmable computer processor to indicate a DATA CHECK/LOST POSITIONING error message; and computer readable program code which causes said programmable computer processor to indicate an UNWRITTEN DEFERRED TAPE MARK error message.

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L6: Entry 3 of 4 File: PGPB Apr 3, 2003

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INVENTOR-INFORMATION:

| NAME | CITY | STATE | COUNTRY | RULE-47 |
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US-CL-CURRENT: 360/69; 360/74.1

CLAIMS:

We claim:

1. A data storage device comprising a computer useable medium having computer readable program code disposed therein for recording information on a data storage medium, the computer readable program code comprising a series of computer readable program steps to effect: receiving a first command to record first information on said data storage medium; receiving said first information; moving said data storage medium in a first direction; recording said first information beginning at a first time on said moving data storage medium; receiving a first deferred conditional write tape mark command; and setting at a second time a first deferred conditional tape mark indicator.

2. The data storage device of claim 1, wherein said first information comprises: a first header label group; first data; and a first trailer label group.

3. The data storage device of claim 2, wherein said computer readable program code further comprises a series of computer readable program steps to effect: writing said first header label group to said moving data storage medium; writing a first tape mark adjacent said first header label group; writing said first data adjacent said first tape mark; writing a second tape mark adjacent said first data; writing said first trailer label group adjacent said second tape mark; and writing a third tape mark adjacent said first trailer label group.

4. The data storage device of claim 1, wherein said computer readable program code further comprises a series of computer readable program steps to effect: specifying a deferred conditional tape mark indicator time interval; and maintaining said first deferred conditional tape mark indicator during said deferred conditional tape mark indicator time interval.

5. The data storage device of claim 4, wherein said deferred conditional tape mark indicator time interval is between about 5 seconds and about 20 seconds.

6. The data storage device of claim 5, wherein said deferred conditional tape mark

indicator time interval is about 10 seconds.

7. The data storage device of claim 4, wherein said computer readable program code further comprises a series of computer readable program steps to effect: receiving a second command at a third time to record second information on said data storage medium, wherein the time interval between said second time and said third time is less than said deferred conditional tape mark indicator time interval; receiving said second information; resetting said first conditional deferred tape mark indicator; moving said data storage medium in a first direction; recording said second information on said moving data storage medium; receiving a second deferred conditional write tape mark command; setting a second deferred conditional tape mark indicator at a fourth time; moving said data storage medium only in said first direction during the time interval between said first time and said fourth time.

8. The data storage device of claim 7, wherein said second information comprises: a second header label group; second data; and a second trailer label group.

9. The data storage device of claim 8, wherein said computer readable program code further comprises a series of computer readable program steps to effect: writing said second header label group to said moving data storage medium adjacent said third tape mark; writing a fourth tape mark to said moving data storage medium adjacent said second header label group; writing said second data to said moving data storage medium adjacent said fourth tape mark; writing a fifth tape mark to said moving data storage medium adjacent said second data; writing said second trailer label group to said moving data storage medium adjacent said fifth tape mark; and writing a sixth tape mark to said moving data storage medium adjacent said second trailer label group.

10. The data storage device of claim 3, wherein said computer readable program code further comprises a series of computer readable program steps to effect: receiving a second command, wherein said second command causes motion of said data storage medium in a second direction or causes synchronization of said data storage medium; resetting said first deferred conditional tape mark indicator; disposing a double tape mark on said data storage medium by writing a fourth tape mark adjacent said third tape mark; moving said data storage medium in a second direction; positioning said read/write head between said third tape mark and said fourth tape mark.

11. The data storage device of claim 10, wherein said computer readable program code further comprises a series of computer readable program steps to effect: determining if said double tape mark was successfully written to said data storage medium; determining if said read/write head was successfully positioned between said third tape mark and said fourth tape mark.

12. The data storage device of claim 11, wherein said double tape mark was not successfully written to said data storage medium, and wherein said read/write head was successfully repositioned between said third tape mark and said fourth tape mark, wherein said computer readable program code further comprises a series of computer readable program steps to effect indicating an UNWRITTEN DEFERRED TAPE MARK error message.

13. The data storage device of claim 11, wherein said double tape mark was successfully written to said data storage medium, and wherein said read/write head was not successfully repositioned between said third tape mark and said fourth tape mark, wherein said computer readable program code further comprises a series of computer readable program steps to effect indicating a DATA CHECK/LOST POSITIONING error message.

14. The data storage device of claim 11, wherein said double tape mark was not successfully written to said data storage medium, and wherein said read/write head was not successfully repositioned between said third tape mark and said fourth tape mark, wherein said computer readable program code further comprises a series of computer readable program steps to effect: indicating a DATA CHECK/LOST POSITIONING error message; and indicating an UNWRITTEN DEFERRED TAPE MARK error message.

15. A data storage and retrieval system comprising a data storage device, a data

storage medium removeably disposed in said data storage device, and a host computer which provides first information to said data storage device, wherein said data storage device comprises a computer useable medium having computer readable program code disposed therein for recording information on a data storage medium storage medium, the computer readable program code comprising a series of computer readable program steps to effect: receiving a first command to record first information on said data storage medium; receiving said first information; moving said data storage medium in a first direction; recording said first information on said moving data storage medium beginning at a first time; receiving a first deferred conditional write tape mark command; and setting a first deferred conditional tape mark indicator at a second time.

16. The data storage and retrieval system of claim 15, wherein said first information comprises: a first header label group; first data; and a first trailer label group.

17. The data storage and retrieval system of claim 16, wherein said computer readable program code further comprises a series of computer readable program steps to effect: writing said first header label group to said moving data storage medium; writing a first tape mark adjacent said first header label group; writing said first data adjacent said first tape mark; writing a second tape mark adjacent said first data; writing said first trailer label group adjacent said second tape mark; and writing a third tape mark adjacent said first trailer label group.

18. The data storage and retrieval system of claim 15, wherein said computer readable program code further comprises a series of computer readable program steps to effect: specifying a deferred conditional tape mark indicator time interval; and maintaining said first deferred conditional tape mark indicator during said deferred conditional tape mark indicator time interval.

19. The data storage and retrieval system of claim 18, wherein said deferred conditional tape mark indicator time interval is between about 5 seconds and about 20 seconds.

20. The data storage and retrieval system of claim 19, wherein said deferred conditional tape mark indicator time interval is about 10 seconds.

21. The data storage and retrieval system of claim 15, wherein said computer readable program code further comprises a series of computer readable program steps to effect: receiving a second command at a third time to record second information on said data storage medium, wherein the time interval between said second time and said third time is less than said deferred conditional tape mark indicator time interval; receiving said second information from said host computer; resetting said first conditional deferred tape mark indicator; moving said data storage medium in said second direction; recording said second information on said moving data storage medium; receiving a second deferred conditional write tape mark command; setting a second deferred conditional tape mark indicator at a fourth time; wherein said data storage medium is moved only in said first direction during the time interval between said first time and said fourth time.

22. The data storage and retrieval system of claim 21, wherein said second information comprises: a second header label group; second data; and a second trailer label group.

23. The data storage and retrieval system of claim 22, wherein said computer readable program code further comprises a series of computer readable program steps to effect: writing said second header label group to said moving data storage medium adjacent said third tape mark; writing a fourth tape mark to said moving data storage medium adjacent said second header label group; writing said second data to said moving data storage medium adjacent said fourth tape mark; writing a fifth tape mark to said moving data storage medium adjacent said second data; writing said second trailer label group to said moving data storage medium adjacent said fifth tape mark; and writing a sixth tape mark to said moving data storage medium adjacent said second trailer label group.

24. The data storage and retrieval system of claim 15, wherein said computer readable program code further comprises a series of computer readable program steps to effect: receiving a second command, wherein said second command causes motion of said data storage medium in a second direction or causes synchronization of said data storage medium; resetting said first deferred conditional tape mark indicator; disposing a double tape mark on said data storage medium by writing a fourth tape mark adjacent said third tape mark; moving said data storage medium in a second direction; positioning said read/write head between said third tape mark and said fourth tape mark.

25. The data storage and retrieval system of claim 24, wherein said computer readable program code further comprises a series of computer readable program steps to effect: determining if said double tape mark was successfully written to said data storage medium; determining if said read/write head was successfully positioned between said third tape mark and said fourth tape mark.

26. The data storage and retrieval system of claim 25, wherein said double tape mark was not successfully written to said data storage medium, and wherein said read/write head was successfully repositioned between said third tape mark and said fourth tape mark, wherein said computer readable program code further comprises a series of computer readable program steps to effect indicating an UNWRITTEN DEFERRED TAPE MARK error message.

27. The data storage and retrieval system of claim 25, wherein said double tape mark was successfully written to said data storage medium, and wherein said read/write head was not successfully repositioned between said third tape mark and said fourth tape mark, wherein said computer readable program code further comprises a series of computer readable program steps to effect indicating a DATA CHECK/LOST POSITIONING error message.

28. The data storage and retrieval system of claim 25, wherein said double tape mark was not successfully written to said data storage medium, and wherein said read/write head was not successfully repositioned between said third tape mark and said fourth tape mark, wherein said computer readable program code further comprises a series of computer readable program steps to effect: indicating a DATA CHECK/LOST POSITIONING error message; and indicating an UNWRITTEN DEFERRED TAPE MARK error message.

29. A computer program product usable with a programmable computer processor having computer readable program code embodied therein for disposing information on a data storage medium using a data storage device comprising a read/write head, comprising: computer readable program code which causes said programmable computer processor to receive a first command to record first information on said data storage medium; computer readable program code which causes said programmable computer processor to receive said first information; computer readable program code which causes said programmable computer processor to move said data storage medium in a first direction; computer readable program code which causes said programmable computer processor to record said first information on said moving data storage medium beginning at a first time; computer readable program code which causes said programmable computer processor to receive a first deferred conditional write tape mark command; and computer readable program code which causes said programmable computer processor to set a first deferred conditional tape mark indicator at a second time.

30. The computer program product of claim 29, wherein said first information comprises: a first header label group; first data; and a first trailer label group.

31. The computer program product of claim 30, further comprising: computer readable program code which causes said programmable computer processor to write said first header label group to said moving data storage medium; computer readable program code which causes said programmable computer processor to write a first tape mark adjacent said first header label group; computer readable program code which causes said programmable computer processor to write said first data adjacent said first tape mark; computer readable program code which causes said programmable computer processor to write a second tape mark adjacent said first data; computer readable

program code which causes said programmable computer processor to write said first trailer label group adjacent said second tape mark; and computer readable program code which causes said programmable computer processor to write a third tape mark adjacent said first trailer label group.

32. The computer program product of claim 29, further comprising: computer readable program code which causes said programmable computer processor to specify a deferred conditional tape mark indicator time interval; and computer readable program code which causes said programmable computer processor to maintain said first deferred conditional tape mark indicator during said deferred conditional tape mark indicator time interval.

33. The computer program product of claim 32, wherein said deferred conditional tape mark indicator time interval is between about 5 seconds and about 20 seconds.

34. The computer program product of claim 33, wherein said deferred conditional tape mark indicator time interval is about 10 seconds.

35. The computer program product of claim 32, further comprising: computer readable program code which causes said programmable computer processor to receive a second command at a third time to record second information on said data storage medium, wherein the time interval between said second time and said third time is less than said deferred conditional tape mark indicator time interval; computer readable program code which causes said programmable computer processor to receive said second information; computer readable program code which causes said programmable computer processor to reset said first conditional deferred tape mark indicator; computer readable program code which causes said programmable computer processor to move said data storage medium in said first direction; computer readable program code which causes said programmable computer processor to record said second information on said moving data storage medium; computer readable program code which causes said programmable computer processor to receive a second deferred conditional write tape mark command; computer readable program code which causes said programmable computer processor to set a second deferred conditional tape mark indicator at a fourth time; computer readable program code which causes said programmable computer processor to move said data storage medium only in said first direction during the time interval between said first time and said fourth time.

36. The computer program product of claim 35, wherein said second information comprises: a second header label group; second data; and a second trailer label group.

37. The computer program product of claim 36, further comprising: computer readable program code which causes said programmable computer processor to write said second header label group to said moving data storage medium adjacent said third tape mark; computer readable program code which causes said programmable computer processor to write a fourth tape mark to said moving data storage medium adjacent said second header label group; computer readable program code which causes said programmable computer processor to write said second data to said moving data storage medium adjacent said fourth tape mark; computer readable program code which causes said programmable computer processor to write a fifth tape mark to said moving data storage medium adjacent said second data; computer readable program code which causes said programmable computer processor to write said second trailer label group to said moving data storage medium adjacent said fifth tape mark; and computer readable program code which causes said programmable computer processor to write a sixth tape mark to said moving data storage medium adjacent said second trailer label group.

38. The computer program product of claim 35, further comprising: computer readable program code which causes said programmable computer processor to receive a second command, wherein said second command causes motion of said data storage medium in a second direction or causes synchronization of said data storage medium; computer readable program code which causes said programmable computer processor to reset said first deferred conditional tape mark indicator; computer readable program code which causes said programmable computer processor to dispose a double tape mark on said data storage medium by writing a fourth tape mark adjacent said third tape

mark; computer readable program code which causes said programmable computer processor to move said data storage medium in a second direction; computer readable program code which causes said programmable computer processor to position said read/write head between said third tape mark and said fourth tape mark.

39. The computer program product of claim 38, further comprising: computer readable program code which causes said programmable computer processor to determine if said double tape mark was successfully written to said data storage medium; and computer readable program code which causes said programmable computer processor to determine if said read/write head was successfully positioned between said third tape mark and said fourth tape mark.

40. The computer program product of claim 39, wherein said double tape mark was not successfully written to said data storage medium, and wherein said read/write head was successfully repositioned between said third tape mark and said fourth tape mark, further comprising computer readable program code which causes said programmable computer processor to a series of computer readable program steps to indicate an UNWRITTEN DEFERRED TAPE MARK error message.

41. The computer program product of claim 39, wherein said double tape mark was successfully written to said data storage medium, and wherein said read/write head was not successfully repositioned between said third tape mark and said fourth tape mark, further comprising computer readable program code which causes said programmable computer processor to a series of computer readable program steps to indicate a DATA CHECK/LOST POSITIONING error message.

42. The computer program product of claim 39, wherein said double tape mark was not successfully written to said data storage medium, and wherein said read/write head was not successfully repositioned between said third tape mark and said fourth tape mark, further comprising: computer readable program code which causes said programmable computer processor to indicate a DATA CHECK/LOST POSITIONING error message; and computer readable program code which causes said programmable computer processor to indicate an UNWRITTEN DEFERRED TAPE MARK error message.

WEST

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INVENTOR-INFORMATION:

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CLAIMS:

We claim:

1. A method to dispose information on a data storage medium using a data storage device, comprising the steps of: providing a first command instructing said data storage device to record first information on said data storage medium; providing said first information to said data storage device; disposing said data storage medium in said data storage device; moving said data storage medium in a first direction; recording said first information beginning at a first time on said moving data storage medium; issuing a first deferred conditional write tape mark command; and setting at a second time a first deferred conditional tape mark indicator.

2. The method of claim 1, wherein said first information comprises: a first header label group; first data; and a first trailer label group.

3. The method of claim 2, further comprising the steps of: writing said first header label group to said moving data storage medium; writing a first tape mark adjacent said first header label group; writing said first data adjacent said first tape mark; writing a second tape mark adjacent said first data; writing said first trailer label group adjacent said second tape mark; and writing a third tape mark adjacent said first trailer label group.

4. The method of claim 1, further comprising the steps of: specifying a deferred conditional tape mark indicator time interval; and maintaining said first deferred conditional tape mark indicator during said deferred conditional tape mark indicator time interval.

5. The method of claim 4, wherein said deferred conditional tape mark indicator time interval is between about 5 seconds and about 20 seconds.

6. The method of claim 5, wherein said deferred conditional tape mark indicator time interval is about 10 seconds.

7. The method of claim 1, further comprising the steps of: providing a second command at a third time instructing said data storage device to record second information on said data storage medium, wherein the time interval between said second time and said third time is less than said deferred conditional tape mark indicator time interval; providing said second information to said data storage device; resetting said first conditional deferred tape mark indicator; recording said second information on said moving data storage medium; issuing a second deferred conditional write tape mark command; setting a second deferred conditional tape mark indicator at a fourth time; moving said data storage medium only in said first direction during the time interval between said first time and said fourth time.

8. The method of claim 7, wherein said second information comprises: a second header label group; second data; and a second trailer label group.

9. The method of claim 8, further comprising the steps of: writing said second header label group to said moving data storage medium adjacent said third tape mark; writing a fourth tape mark to said moving data storage medium adjacent said second header label group; writing said second data to said moving data storage medium adjacent said fourth tape mark; writing a fifth tape mark to said moving data storage medium adjacent said second data; writing said second trailer label group to said moving data storage medium adjacent said fifth tape mark; and writing a sixth tape mark to said moving data storage medium adjacent said second trailer label group.

10. The method of claim 3, wherein said data storage device comprises a read/write head, further comprising the steps of: providing a second command to said data storage drive, wherein said second command causes motion or synchronization of said data storage medium; resetting said first deferred conditional tape mark indicator; disposing a double tape mark on said data storage medium by writing a fourth tape mark adjacent said third tape mark; moving said data storage medium in a second direction; repositioning said read/write head between said third tape mark and said fourth tape mark.

11. The method of claim 10, further comprising the steps of: determining if said double tape mark was successfully written to said tape; determining if said read/write head was successfully positioned between said third tape mark and said fourth tape mark.

12. The method of claim 11, wherein said double tape mark was not successfully written to said tape, and wherein said read/write head was successfully repositioned between said third tape mark and said fourth tape mark, said method further comprising the step of indicating an UNWRITTEN DEFERRED TAPE MARK error message.

13. The method of claim 11, wherein said double tape mark was successfully written to said tape, and wherein said read/write head was not successfully repositioned between said third tape mark and said fourth tape mark, said method further comprising the step of indicating a DATA CHECK/LOST POSITIONING error message.

14. The method of claim 11, wherein said double tape mark was not successfully written to said tape, and wherein said read/write head was not successfully repositioned between said third tape mark and said fourth tape mark, said method further comprising the steps of: indicating a DATA CHECK/LOST POSITIONING error message; and indicating an UNWRITTEN DEFERRED TAPE MARK error message.

15. A data storage and retrieval system comprising a computer useable medium having computer readable program code disposed therein for disposing information on a data storage medium using a data storage device, wherein said data storage and retrieval system comprises a data storage device, a data storage medium, and a host computer which provides first information to said data storage device, the computer readable program code comprising a series of computer readable program steps to effect:

providing at a first time a first command instructing said data storage device to record first information on said data storage medium; disposing said portable data storage medium in said data storage device; issuing at a second time a first deferred conditional write tape mark command after said first information is recorded on said data storage medium.

16. The data storage and retrieval system of claim 15, wherein said first information comprises: a first header label group; first data; and a first trailer label group.

17. The data storage and retrieval system of claim 15, wherein said host computer provides second information to said data storage unit, wherein said computer readable program code further comprises a series of computer readable program steps to effect: providing a second command at a third time instructing said data storage device to record second information on said data storage medium, wherein the time interval between said second time and said third time is less than about 10 seconds; issuing a second deferred conditional write tape mark command after said second information is recorded on said data storage medium.

18. The data storage and retrieval system of claim 17, wherein said second information comprises: a second header label group; second data; and a second trailer label group.

19. The data storage and retrieval system of claim 15, wherein said data storage device comprises a read/write head, said computer readable program code further comprises a series of computer readable program steps to effect: providing a second command to said data storage drive, wherein said second command causes motion or synchronization of said data storage medium; disposing a double tape mark comprising a first tape mark and a second tape mark on said data storage medium adjacent said first information and positions said read/write head between said first tape mark and said second tape mark; and determining if said double tape mark was successfully written to said tape; and determining if said read/write head was successfully positioned between said first tape mark and said second tape mark.

20. The data storage and retrieval system of claim 19, wherein said double tape mark was not successfully written to said tape, and wherein said read/write head was successfully repositioned between said third tape mark and said fourth tape mark, wherein said computer readable program code further comprises a series of computer readable program steps to effect providing an UNWRITTEN DEFERRED TAPE MARK error message.

21. The data storage and retrieval system of claim 19, wherein said double tape mark was successfully written to said tape, and wherein said read/write head was not successfully repositioned between said third tape mark and said fourth tape mark, wherein said computer readable program code further comprises a series of computer readable program steps to effect providing a DATA CHECK/LOST POSITIONING error message.

22. The data storage and retrieval system of claim 19, wherein said double tape mark was not successfully written to said tape, and wherein said read/write head was not successfully repositioned between said third tape mark and said fourth tape mark, wherein said computer readable program code further comprises a series of computer readable program steps to effect: providing a DATA CHECK/LOST POSITIONING error message; and providing an UNWRITTEN DEFERRED TAPE MARK error message.

23. A computer program product usable with a programmable computer processor having computer readable program code embodied therein for disposing information on a data storage medium using a data storage device, comprising: computer readable program code which causes said programmable computer processor to provide a first command instructing said data storage device to record first information on said data storage medium; computer readable program code which causes said programmable computer processor to provide said first information to said data storage device; computer readable program code which causes said programmable computer processor to dispose said data storage medium in said data storage device; computer readable program code which causes said programmable computer processor to move said data

storage medium in a first direction; computer readable program code which causes said programmable computer processor to record said first information beginning at a first time on said moving data storage medium; computer readable program code which causes said programmable computer processor to issue a first deferred conditional write tape mark command; and computer readable program code which causes said programmable computer processor to set at a second time a first deferred conditional tape mark indicator.

24. The computer program product of claim 23, wherein said first information comprises: a first header label group; first data; and a first trailer label group.

25. The computer program product of claim 24, further comprising: computer readable program code which causes said programmable computer processor to write said first header label group to said moving data storage medium; computer readable program code which causes said programmable computer processor to write a first tape mark adjacent said first header label group; computer readable program code which causes said programmable computer processor to write said first data adjacent said first tape mark; computer readable program code which causes said programmable computer processor to write a second tape mark adjacent said first data; computer readable program code which causes said programmable computer processor to write said first trailer label group adjacent said second tape mark; and computer readable program code which causes said programmable computer processor to write a third tape mark adjacent said first trailer label group.

26. The computer program product of claim 23, further comprising: computer readable program code which causes said programmable computer processor to specify a deferred conditional tape mark indicator time interval; and computer readable program code which causes said programmable computer processor to maintain said first deferred conditional tape mark indicator during said deferred conditional tape mark indicator time interval.

27. The computer program product of claim 26, wherein said deferred conditional tape mark indicator time interval is between about 5 seconds and about 20 seconds.

28. The computer program product of claim 27, wherein said deferred conditional tape mark indicator time interval is about 10 seconds.

29. The computer program product of claim 23, further comprising: computer readable program code which causes said programmable computer processor to provide a second command at a third time instructing said data storage device to record second information on said data storage medium, wherein the time interval between said second time and said third time is less than said deferred conditional tape mark indicator time interval; computer readable program code which causes said programmable computer processor to provide said second information to said data storage device; computer readable program code which causes said programmable computer processor to reset said first conditional deferred tape mark indicator; computer readable program code which causes said programmable computer processor to record said second information on said moving data storage medium; computer readable program code which causes said programmable computer processor to issue a second deferred conditional write tape mark command; computer readable program code which causes said programmable computer processor to set a second deferred conditional tape mark indicator at a fourth time; computer readable program code which causes said programmable computer processor to move said data storage medium only in said first direction during the time interval between said first time and said fourth time.

30. The computer program product of claim 29, wherein said second information comprises: a second header label group; second data; and a second trailer label group.

31. The computer program product of claim 30, further comprising: computer readable program code which causes said programmable computer processor to write said second header label group to said moving data storage medium adjacent said third tape mark; computer readable program code which causes said programmable computer processor to write a fourth tape mark to said moving data storage medium adjacent said second

header label group; computer readable program code which causes said programmable computer processor to write said second data to said moving data storage medium adjacent said fourth tape mark; computer readable program code which causes said programmable computer processor to write a fifth tape mark to said moving data storage medium adjacent said second data; computer readable program code which causes said programmable computer processor to write said second trailer label group to said moving data storage medium adjacent said fifth tape mark; and computer readable program code which causes said programmable computer processor to write a sixth tape mark to said moving data storage medium adjacent said second trailer label group.

32. The computer program product of claim 26, wherein said data storage device comprises a read/write head, further comprising: computer readable program code which causes said programmable computer processor to provide a second command to said data storage drive, wherein said second command causes motion or synchronization of said data storage medium; computer readable program code which causes said programmable computer processor to reset said first deferred conditional tape mark indicator; computer readable program code which causes said programmable computer processor to dispose a double tape mark on said data storage medium by writing a fourth tape mark adjacent said third tape mark; computer readable program code which causes said programmable computer processor to move said data storage medium in a second direction; computer readable program code which causes said programmable computer processor to position said read/write head between said third tape mark and said fourth tape mark.

33. The computer program product of claim 32, further comprising: computer readable program code which causes said programmable computer processor to determine if said double tape mark was successfully written to said tape; computer readable program code which causes said programmable computer processor to determine if said read/write head was successfully positioned between said third tape mark and said fourth tape mark.

34. The computer program product of claim 33, wherein said double tape mark was not successfully written to said tape, and wherein said read/write head was successfully repositioned between said third tape mark and said fourth tape mark, further comprising computer readable program code which causes said programmable computer processor to indicate an UNWRITTEN DEFERRED TAPE MARK error message.

35. The computer program product of claim 33, wherein said double tape mark was successfully written to said tape, and wherein said read/write head was not successfully repositioned between said third tape mark and said fourth tape mark, further comprising computer readable program code which causes said programmable computer processor to indicate a DATA CHECK/LOST POSITIONING error message.

36. The computer program product of claim 11, wherein said double tape mark was not successfully written to said tape, and wherein said read/write head was not successfully repositioned between said third tape mark and said fourth tape mark, further comprising: computer readable program code which causes said programmable computer processor to indicate a DATA CHECK/LOST POSITIONING error message; and computer readable program code which causes said programmable computer processor to indicate an UNWRITTEN DEFERRED TAPE MARK error message.